GPS ROLLOVER ALERT
for
OmniSat-1 GOES Transmitters –
Design Analysis and Vaisala

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This Alert pertains to large group of Design Analysis data collection platforms that use the Signal Engineering OmniSat-1 GOES transmitter.

Signal Engineering certified a GOES V1.0B 300/1200 baud transmitter model called the "OmniSat" in March 2004 and manufactured it until about 2010. It is referred to as the "OmniSat-1" to distinguish it from the later GOES V2.0 OmniSat-2 and OmniSat-3 transmitters. Most OmniSat-1s have a GPS receiver for highly accurate time keeping required for GOES transmissions.

These transmitters have, or will soon, exceed their memory capacity used to store the week number received from GPS satellites. The OmniSat-1 stores the number of weeks in 10 binary digits of memory, which has a maximum value of 1,023. Therefore, 1,023 weeks (19.6 years) after the creation of the firmware, the week counter will reset to 0 and the transmitter will "think" that the day is a date from 19.6 years ago. When this occurs, the transmitter will wait for that date to occur again before it transmits, which of course will never happen. This event is referred to as the GPS Week Number Rollover (WNRO), and it will cause these radios to stop transmitting.

Given that these receivers have been in service for so many years, there may not be many (or any) still in use, so these deadlines may not be consequential. Nonetheless, Signal Engineering has created a new version of OmniSat-1 firmware (V2.8) that resets the week counter so that the units can continue to transmit.   Signal Engineering **Product Service Bulletin PSB-24000-0001** provides the necessary procedure to upgrade these radios.

Three sets of serial numbers are affected but each has a different rollover date. Most of these units were sold to Vaisala and Design Analysis. Only units from Design Analysis were distributed by the HIF. **Below are the sets of Serial Numbers for each of the three groups of OmniSat-1 GOES transmitters shipped to Design Analysis.**

These Serial Numbers were assigned by Signal Engineering. Details of the serial number formats and where they can be found is contained in **PSB-24000-0001**.

Below is a list of the Unit Serial Numbers of the three groups of all OmniSat-1 GOES transmitters that were shipped to Design Analysis over the entire production run of the OmniSat-1 transmitter.

The GPS receivers in each of these three groups will undergo a GPS Week Number Roll-Over (WNRO) at different times.

These are the OmniSat-1 Serial Numbers assigned by Signal Engineering. <u>If the OmniSat-1 has two labels on it, the Serial Number from the lists below will appear on the silver label with "Signal Engineering, Inc." at the top (see Figure 4 - OmniSat-1 with 10-pin Control Connector and Design Analysis Labelling in **Product Service Bulletin PSB-24000-0001**</u>).

The complete range of Signal Engineering serial numbers for OmniSat-1s shipped to Design Analysis was 1005 to 1521 and 6006 to 11790.

The reason for the gap between serial numbers 1521 and 6006 is that Signal Engineering switched to a smaller serial label on Design Analysis OmniSat-1s after serial numbers 1005 to 1521. Changing to a new serial number range made it simpler to keep track of which OmniSats were sold to which customer so the new labels started at serial number 6000, but serial numbers 6000 to 6004 were used for testing and not shipped.

Group 1: Serial Numbers from 1005 to 1099
Number of OmniSat-1s in this group = 95.
The GPS WNRO for this group of OmniSat-1s already occurred on 4-7-2019.

Any unit in Group1 that is still operable can be made usable again by reloading the OmniSat-1 with the new transmitter firmware specified in **Product Service Bulletin PSB-24000-0001**.

Group 2: Serial Numbers 1100 to 1521, 6006 to 6666, 6668, 6681 and 6682.
Number of OmniSat-1s in this group = 1086.
The GPS WNRO for this group of OmniSat-1s will occur on 3-19-2023.

Group 3: Serial Numbers 6667, 6669 to 6680, and 6683 to 11790
Number of OmniSat-1s in this group = 5121.
The GPS WNRO for this group of OmniSat-1s will occur on 7-6-2025. This date is <u>less than 11 months</u> from the conversion deadline for DCPs to migrate to CS2.

If you have any questions or find that you own one of the affected OmniSat transmitters and need the firmware to upgrade, please contact Richard Pardee (rwpardee@usgs.gov)

This information could be of interest for sites managed by the USACE or other cooperators or agencies. Please share this information so that others can avoid any problems.

(continued)

Addendum to:
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(10/17/2022)

Additional Information from Signal Engineering on Equipment Nomenclature and Identification

OmniSat-1 transmitters may have labels that say "OmniSat-GPS," and the picture (below) shows SERIAL NO. 011436, puts that transmitter in Group 3 (where the GPS WNRO will occur on July 6, 2025). "OmniSat-GPS" was a Signal Engineering type designation.

The "OmniSat-1" transmitter was certified and registered with NESDIS as the "OmniSat" model GOES V1.0B transmitter. "OmniSat-1's appears on DADDS as "OmniSat" model transmitters. "OmniSat-1" is a term of convenience used to distinguish these transmitters from the OmniSat-2 and OmniSat-3 (both GOES Version 2.0 transmitters).

Most GOES OmniSat-1 transmitters should have one of the three different label types shown in Product Service Bulletin PSB-24000-0001:

1. OmniSat-1's sold to Vaisala will have one large label that says (in part) "VAISALA GOES DCP TRANSMITTER," "MODEL NO. V1200100," and at the bottom, "Registered Model No. OmniSat."

2. Most OmniSat-1s sold to Design Analysis will have a small label that says (in part) "Signal Engineering, Inc. OmniSat-GPS GOES DCP TRANSMITTER," "MODEL OmniSat." The serial

number on this label will be compared to the serial number provided with the different GPS WNRO dates.

Most D.A. OmniSat-1s will also have a second label added by Design Analysis showing (in part) "WATERLOG Series Model H-222DASE Goes Transmitter."

3. A few OmniSat-1s sold to Design Analysis may have just one large label that says (in part) "Signal Engineering, Inc. OmniSat-GPS GOES DCP TRANSMITTER," "MODEL OmniSat."

OmniSat-1s that were sold to OTT may have either one large label that says (in part) "Signal Engineering, Inc. OmniSat-GPS GOES DCP TRANSMITTER," "MODEL OmniSat," or one large label that says (in part) "OTT HDR 1200 GOES DCP TRANSMITTER," "MODEL NO. OmniSat."

Small quantities of OmniSat-1s were also sold to several other distributors and government organizations with just one large label that says (in part), "Signal Engineering, Inc. OmniSat-GPS GOES DCP TRANSMITTER," "MODEL OmniSat."

Recommendations From HIF Lead Electronics Technician:

1. Question: Can you connect to the OmniSat using one of the H-552+'s three external RS-232 ports? Answer: No, you cannot use the external com ports to do this upgrade.

2. The issue is not suspected to involve any DAA transmitters (Grayish color radio), being the last upgrade is applied to all their radios V2.6 (awaiting Xylem's confirmation).

3. The Signal Engineering radios are easy to spot through the 522 openings (Gold color).

4. Suggested that users perform the upgrade to all SE radios in all DAA equipment to take the guessing game out of it and run them until 2026.

5. It is recommended that users do not trust the outside label on 522's SN# since things may have changed or been swapped around (looking for the radio color or opening the lid is the only way to be 100% sure).

6. Making the cable should not be difficult, although some technicians might get confused about which is pin 1 and such. HIF used a 10-pin ribbon connector to ribbon cable to female DB9. That connector was hanging outside of the 522 to make the connection.

7. If permissions are difficult, one option is to use an off-network old Windows XP computer to program the radio, and it should be super easy to follow. It only takes a few minutes and tells you when it is done.

8. Between now and March 2023, every office should make sure to check each 522 that is not CS2. The CS version can be verified by viewing the "Type" column on DADDS at https://dcs1.noaa.gov/ACCOUNT/Login, or by using the GOES DCS Field Test at https://dcs1.noaa.gov/Account/FieldTest.

9. If necessary, HIF can make the 10-pin cable if anyone requires assistance.

Notes on the upgrade process from NJ WSC:

Information set #1:

Did finally get around to successfully updating OmniSat SN 08536 from Boot 2.3, Main 2.3 to Boot 2.3, Main 2.8. This transmitter was installed in DAA H-222DASE SN 1974.

Here's what I learned along the way:

I first checked for continuity the various conductors of the ribbon cable in the H-222DASE that runs from its external 9-pin RS-232 port to the 10-pin connector on the OmniSat and found the following:

RS-232 pin #	3473-6600 pin #
1	9
2	7
3	5
4	3
5	1
6	10
7	8
8	6
9	4
-	2

The highlighted pairs 3-5 and 8-6 are the only two in agreement with those listed in Table 4 on page 7 of PSB-24000-0001 AA. Still, the cable configuration is acceptable because the upgrade was performed using this cable and a standard RS-232 cable WITHOUT a null modem adapter connected to a PC.

Additionally:

- When power was applied to the H-222DASE, the transmitter LED did flash twice as hoped.

- In addition to the .exe file I downloaded from the USGS-OSD-TAPAS Team, the .dll file was also necessary. I had to rename it from OmniComLib(1).dll to OmniComLib.dll for the .exe to run. You'll notice that I also took the liberty of renaming it on the Teams file list as well.

- When I first tried to run the program on my laptop PC, I received the message that Administrator privileges were required, so I ran it instead on an offline laptop for which I DO have Administrator rights, and was successful in the update. Later, I tried to rerun it from my network laptop, and the program ran just fine - but of course, it indicated that the OmniSat-1 had the newest firmware and did not need a firmware load. I don't know why it wouldn't work on my first attempt.

- For future updates to H-522s, I think I'll use a cable from an old H-222DASE. I plan on trying and will let you know how it goes.

Notes on the upgrade process from NJ WSC:

Information set #2:

I removed the ribbon and power cables from the H-222DASE I updated last week (see above); each was about 9 inches long. I lengthened the power cable using butt connectors for convenience in connecting to a battery (last week, the H-222DASE's external power lugs were used to power its transmitter).

The existing power and ribbon cables were disconnected from OmniSat SN 6448 in DAA H-522+ SN 1335. The cables from the H-222DASE and a standard RS-232 cable without a null modem were used successfully to update the transmitter from Boot 1.7, Main 1.8 on the first attempt using my online laptop PC.